Assignment: 2
Due date: Wednesday - 15 April 2020 – 3:00 PM
Course: Object Oriented Programming 2019/2020
Instructors: Dr. Sherin Moussa & Dr. Sally Saad

Ain Shams University
Faculty of Computer
& Information Sciences
2rd year

General instructions:

1) Submit **only** running code.
2) For each question, your program should contain only one package named with "*assignments_package*"
3) For each question, Put all your question solution (code) in one .java file.
   Note that:
   - One .java file can consist of multiple classes which belong to the same question with the restriction that only one of them can be public.
   - The name of the public class must be the same as the name of the .java file.
   - After completing your assignment solution, copy your .java file somewhere else and rename it as per rule 5.
   - You can find the .java file at this path …/src/assignments_package/ XXX.java
4) You must adhere to the name of classes, attributes and functions which are mentioned in the problems' definitions.
5) Rename the .java file as follows: (don't change the first letter [G, S, B, C, M])

• .java file for General Department	*[G]_QuestionNumber_yourSectionNumber_yourID_yourName.java.*
• .java file for Software Department	*[S]_QuestionNumber_yourSectionNumber_yourID_yourName.java.*
• .java file for BIO Department	*[B]_QuestionNumber_yourSectionNumber_yourID_yourName.java.*
• .java file for Cyber Security Department	*[C]_QuestionNumber_yourID_yourName.java.*
• .java file for Multimedia and AI Departments	*[M]_QuestionNumber_yourID_yourName.java.*

   - Watch the following video to know how to merge your code in one file.
     https://drive.google.com/open?id=1AX-T5__lfFCHCPMvCOJAp2TSwWycNlec
6) Submit **TWO** .java files. The first one contains the solution of question 1 and the second one contains the solution of question 2.
7) If you need to re-submit your assignment. You must type the assignment version number, where the version number is 2, 3, 4 etc.… as the following:

• For General Department	*[G]_QestionNumber_yourSectionNumber_yourID_yourName_VersionNumber.java.*
• For Software Department	*[S]_QestionNumber_yourSectionNumber_yourID_yourName_VersionNumber.java.*
• For BIO Department	*[B]_QestionNumber_yourSectionNumber_yourID_yourName_VersionNumber.java.*
• For Cyber Security Department	*[C]_QestionNumber_yourID_yourName_VersionNumber.java.*
• For Multimedia and AI Departments	*[M]_QestionNumber_yourID_yourName_VersionNumber.java.*

8) The due date is [**Wednesday – 15 April 2020 – 3:00 PM**]. Please use the link below to submit your assignment:
   https://docs.google.com/forms/d/e/1FAIpQLScLO5KCbAExKTk9rUbKm1UWFr_ET4bugh kAH2vzLPcGR8foGw/viewform?usp=sf_link

Good luck
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As per rule 1, if your code had any errors, your assignment will not be considered. So, if you have any errors in your assignment, use Google to try to resolve your errors and if you didn't find the problem, please contact the TAs through the announced online sessions to help you. **As per rules 5 and 7, if you didn't rename your uploaded file as mentioned above, the automation process will ignore your assignment.**

Marks will be deducted for not following the rules **(-1/instruction)**.
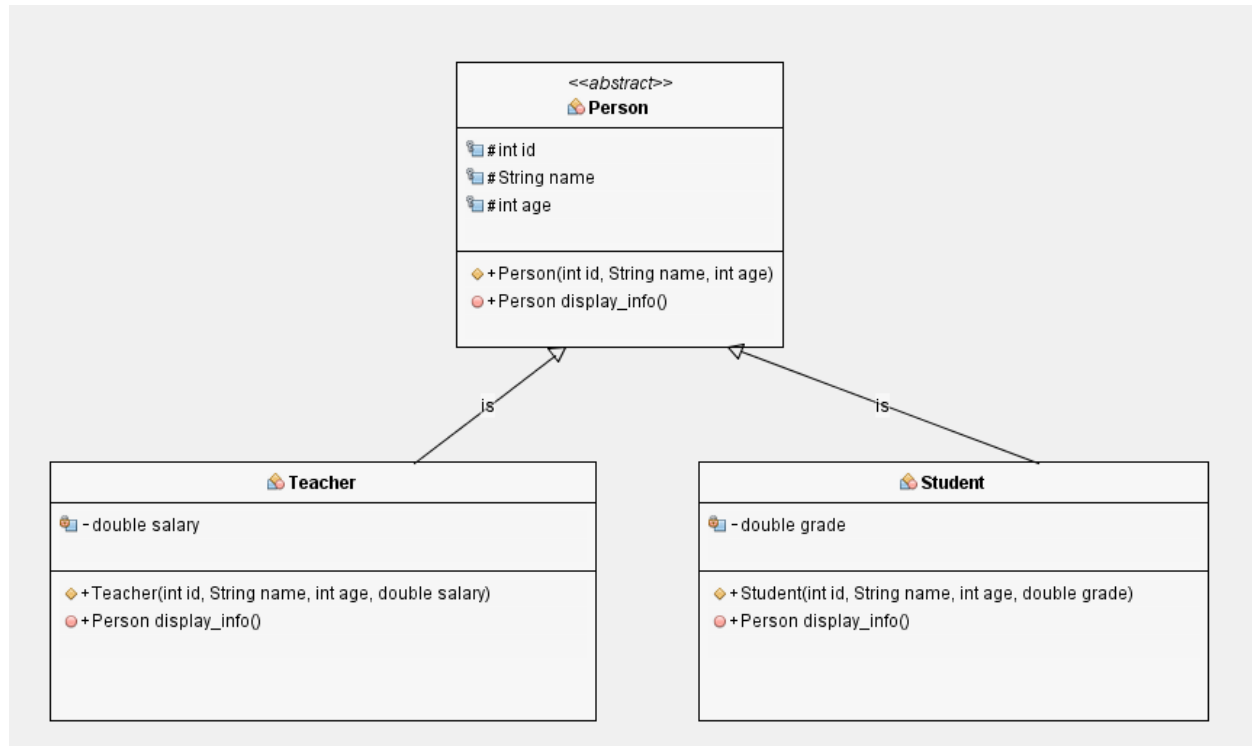
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Assignment Questions

Problem 1:

```
                        <<abstract>>
                        🔺 Person
        ─────────────────────────────────
        🔲 # int id
        🔲 # String name
        🔲 # int age
        ─────────────────────────────────

        🔶 + Person(int id, String name, int age)
        🔴 + Person display_info()
```

```
          🔺 Teacher                              🔺 Student
──────────────────────────────        ──────────────────────────────────
🔲 - double salary                     🔲 - double grade
──────────────────────────────        ──────────────────────────────────

🔶 + Teacher(int id, String name,      🔶 + Student(int id, String name,
     int age, double salary)                int age, double grade)
🔴 + Person display_info()             🔴 + Person display_info()
```

1. Implement this Class diagram
2. Create this GUI for school's system
   (3 labels, 3 text fields, button, 2 radio buttons)
   Hint:
   You would have to add button group to be able to select one radio button only at a time
   Example on the form:

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3. On selecting Teacher radio button, Salary's label and text field are visible

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4. On selecting Student radio button, grade's label and text field are visible

5. Create a user defined exception class called InvalidInput that is used to throw a new exception if:
   a. Grade is negative
   b. Grade is more than 100
   c. Salary is negative

6. Finally, on clicking the add button you will create new object of Teacher or student according to the radio button's selection "if all your data is valid"

7. <u>Sample run:</u>

Good luck
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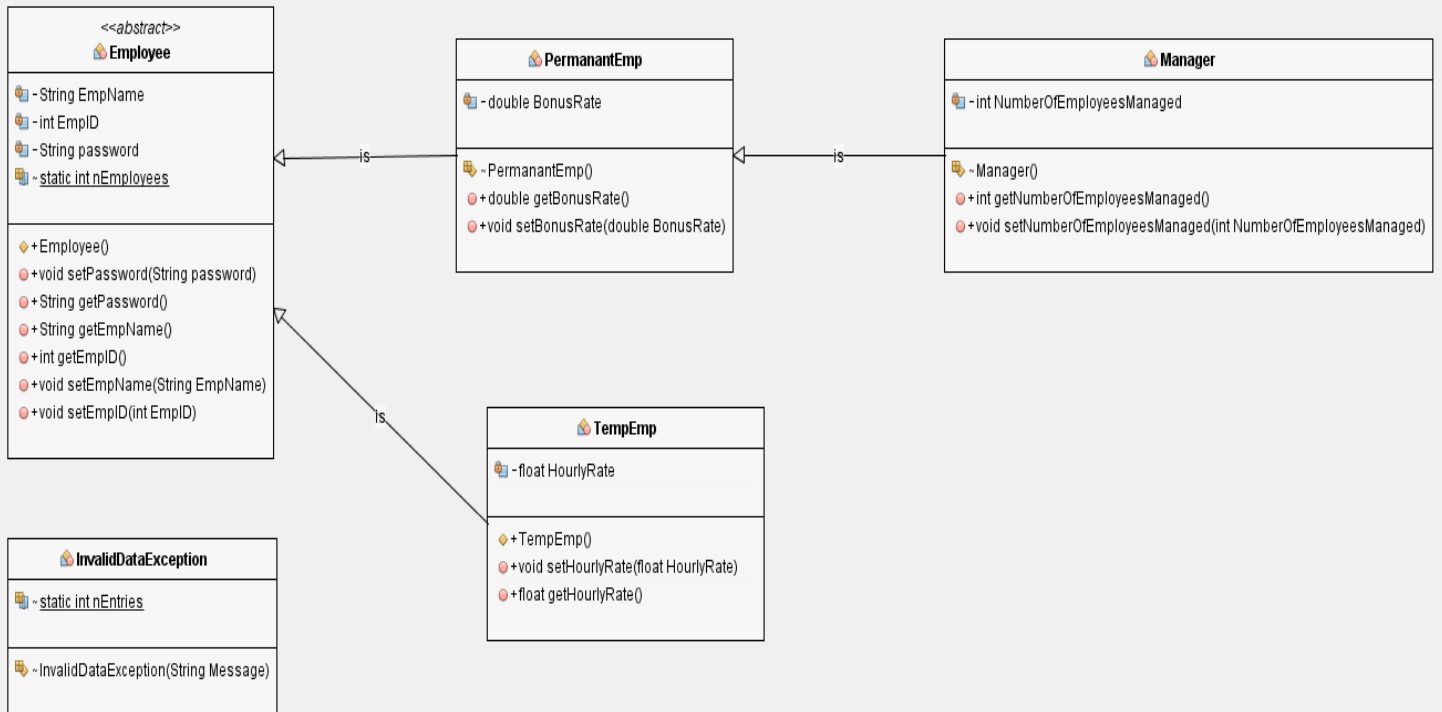**Due date: Wednesday - 15 April 2020 – 3:00 PM**
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a. Adding Teacher

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b. Adding Student

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Problem 2:

1- Implement the above UML Diagram
   ➔ Additional UML Note: "InvalidDataException" class extends Exception class
   ➔ Set BonusRate, NumberOfEmployeesManaged,HourlyRate hardcoded in their corresponding class constructors. (i.e BonusRate = 0.1, HourlyRate = 150, etc.)

2- Create GUI form for adding Employee data. The GUI form should look as follows:

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3- In this form's Jframe class create an array of employees of size 3.

4- When the user clicks the Add Employee button, you should:
   a- Set the next index in the employees' array with an object of the class that corresponds to the radio button selected. (e.g if Manager radio button is selected then set the next element of the array as Object of type Manager).
   b- If no Exceptions were thrown, Set this object's data members with the data input by the user in the text fields.
   c- Clear all text fields
   d- If no Radio button is selected, you should throw an "InvalidDataException" with the message "Must Select Employee Type"

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e- If the two password fields do not match, you should throw an "InvalidDataException" with the message "The password you entered the second time does not match the first time"

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f- If the number of invalid entries by the user exceeds 3, you should show this message and disable the Add Employee button.

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5- When the user clicks the Display extra attribute button, you should:

a- Check the type of the last inserted employee in the array and
if that type is Manager → Display NumberOfEmployeesManaged
if that type is PermanantEmployee → Display BonusRate
if that type is TempEmp → Display Hourly Rate

Employee ID `3`	Employee ID
Employee Name `Mohammed`	Employee Name
Employee Password `*`	Hourly Rate is 150.0
Re-enter Employee Password `*`	OK
○ Manager	
○ Permanant Employee	
◉ Temp Employee	○ Temp Employee
Add Employee	**Add Employee**
Display Extra Attribute	**Display Extra Attribute**

Good luck
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